

Missouri Department of Natural Resources

Total Maximum Daily Load Information Sheet

James River

Waterbody Segment at a Glance:

Counties: Webster, Greene, Christian, Stone
Nearby Cities: Springfield, Ozark,
Nixa, Galena
Length of Impairment: WBID 2347 – 28 miles
WBID 2362 – 26 miles
WBID 2365 – 4.5 miles
Pollutant: Nutrients
Sources: Urban Point and Nonpoint Sources
Agricultural Nonpoint Sources



State map showing location of watershed

Note: WBID = Waterbody Identification [Number]

TMDL Priority Ranking: TMDL approved 2001

Description of the Problem

Beneficial uses of James River

2347 and 2362– Irrigation, Livestock and Wildlife Watering, Protection of Warm Water Aquatic Life, Protection of Human Health associated with Fish Consumption, Whole Body Contact Recreation, Boating and Canoeing, Cool Water Fishery.

2365 – Drinking Water Supply, Livestock and Wildlife Watering, Protection of Warm Water Aquatic Life, Protection of Human Health associated with Fish Consumption, Whole Body Contact Recreation, Boating and Canoeing, Cool Water Fishery.

Uses that are impaired

- Protection of Warm Water Aquatic Life
- Boating and Canoeing

Standards that apply

- The impairment of the James River is based on exceedence of the general criteria contained in Missouri's Water Quality Standards, 10 CSR 20-7.031 (3)(A) and (C). These criteria state:
 - Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses.
 - Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses.

Background information and Water Quality Data

Surface water quality problems in the James River have been documented since 1965. Historically, the major concern was low dissolved oxygen (DO) due to sewage and urban stormwater runoff. Data from

a U.S. Department of the Interior water quality study on the James River in 1969 indicated elevated levels of nutrients, particularly when values were compared above and below the confluence with Wilson Creek. After the Springfield Southwest Treatment Plant was upgraded in 1977, a study by the United States Geological Service (USGS) found DO levels in the James River met the state standard of 5.0 milligrams per liter (mg/L).

The current concern is the discharge of nutrients, especially phosphorus, from sewage treatment plants and the runoff of phosphorus and nitrogen from urban and agricultural nonpoint sources. When waters become rich in nutrients, it results in an increase in plant life and algal blooms. Excessive algal growth is not only aesthetically unpleasant, it causes fundamental changes in a water ecosystem. Dissolved oxygen in the water can become depleted by algal respiration if large amounts of algae are present in a stream. Low levels of dissolved oxygen can cause stress or mortality in fish and other aquatic animals.

Nutrient levels in the James River are also of concern because the James River is a significant source of nutrients for Table Rock Lake. Water clarity in Table Rock Lake was declining over time and that trend is related to increasing nutrient levels, particularly phosphorus. In order to help reduce nutrient levels in the lake, a phosphorus limit of 0.5 mg/L has been imposed on all point sources in the Table Rock Lake watershed that have a design discharge greater than or equal to 22,500 gallons per day.

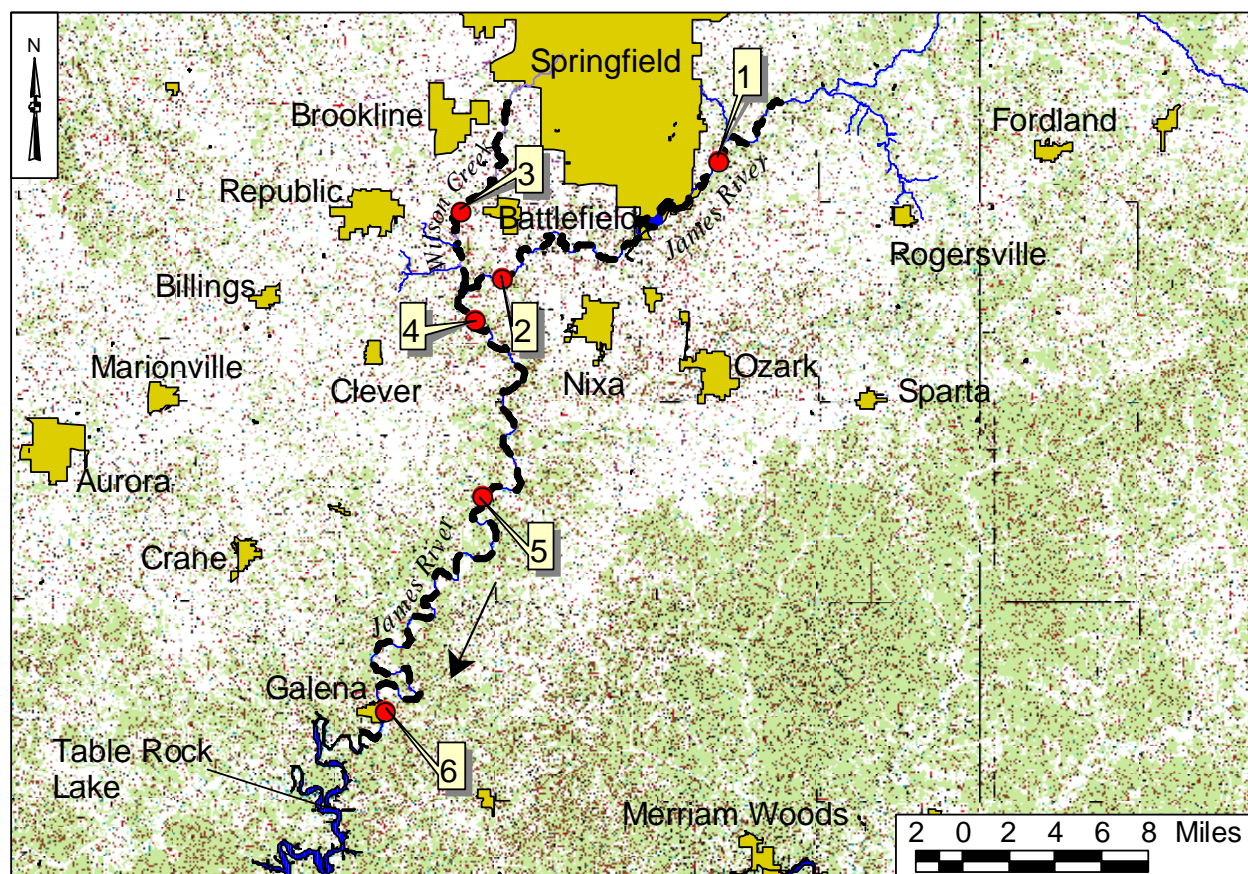
Based on scientific literature, the target load in the James River for total phosphorus has been set at 0.075 mg/L and the in-stream total nitrogen target load has been set at 1.5 mg/L. It is hoped that these levels of nutrient loading will ultimately keep algal growth in the James River and the James River arm of Table Rock Lake at acceptable levels. This TMDL is being developed in phases with the first phase focusing on nutrient loading from point sources and urban stormwater runoff. A monitoring plan to collect needed data was also included. The U.S. Environmental Protection Agency approved the TMDL May 7, 2001. Since then, several WWTPs have come on-line with phosphorus removal and that is already making a positive, measurable difference in Table Rock Lake.

The second phase focuses on all nonpoint sources of nutrient loading in the watershed. Much work has been accomplished since 2001. Several 319 grants and Agricultural Nonpoint Source Special Area Land Treatment (AgNPS SALT) projects are in progress with many Best Management Practices (BMPs) on the ground. Some examples are riparian corridor restoration, cistern and well plugging, total nutrient management plans targeting nitrogen and phosphorus management, and sinkhole protection. Additionally, septic tank clean-out and rebates on the cost of urban soil testing will apply to the urban target area. To further help deal with urban nonpoint source runoff, the Springfield Stormwater Management Plan has been initiated with many urban programs and BMPs started. Examples include flood plain acquisition (by the city), street cleaning, improved de-icing practices, upgrading and creating stormwater detention basins and mapping the whole Springfield area (which helps detect illicit discharges). There are also several watershed groups in the area and much volunteer effort is being spent on behalf of the James River Basin.

On the next pages find:

- A map of the James River area
- Graphs that summarize 1992-1999 data
- A table comparing 1999 data to 2003 data

The James River in Webster, Greene, Christian and Stone Counties, Missouri, Showing Sampling Sites and the Impaired Segments



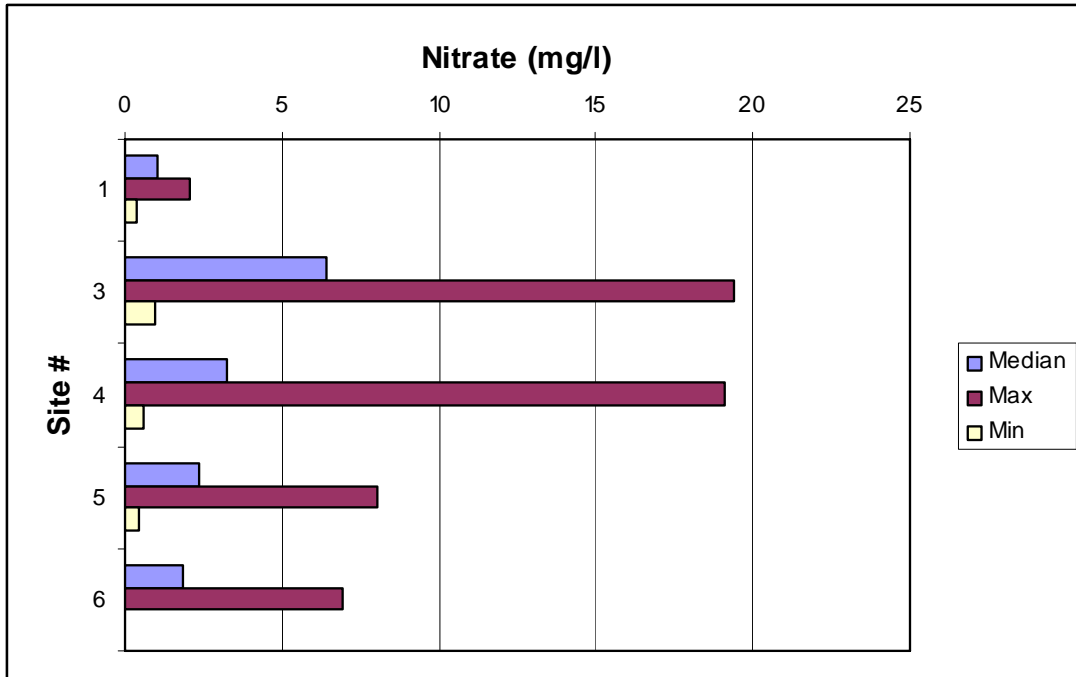
----- Impaired segment

→ Direction of flow

Site Index

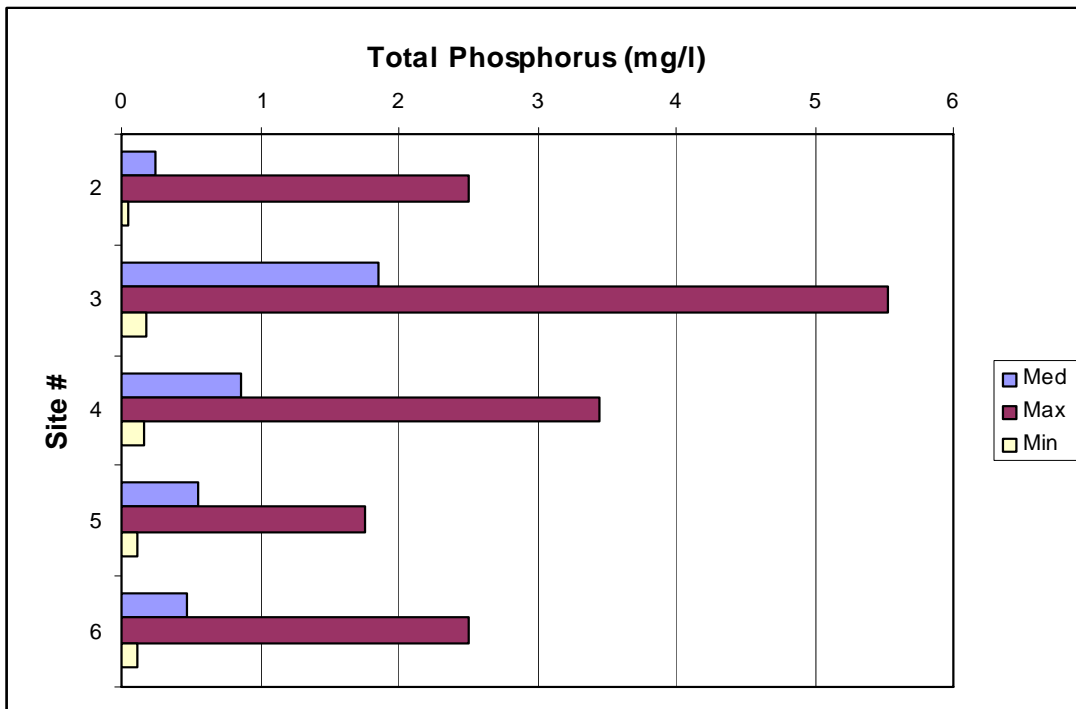
- 1 – James River at Kinser Bridge
- 2 – James River at Nelson Mill
- 3 – Wilson Creek at North End of National Park
- 4 – James River at Delaware Access
- 5 – James River at Hootentown Access
- 6 – James River at Galena

Nitrate concentrations at selected sites in the James River and Wilson Creek, 1992-1999



Sources: City Utilities of Springfield, City of Springfield Public Works

Total Phosphorus concentrations at selected sites in the James River and Wilson Creek, 1993-1999



Source: City of Springfield Public Works

Recent nutrient levels in the James River at two locations are averaged in the table below. The 2003 data was collected as part of Phase I of the TMDL. It is interesting to note that nutrient levels in general have dropped, but Total Nitrogen at Boaz is higher in 2003 than it was in 1999. This is being investigated.

Mean Nutrient Levels for Two Locations on James River Comparing Data from 1999 to 2003 (in mg/L)				
Nutrient	James R. near Boaz, (Site 5)		James R. at Galena (Site 6)	
	1999	2003	1999	2003
Total Nitrogen	4.01	5.19	3.40	2.65
Total Phosphorus	0.62	0.15	0.51	0.21

For more information call or write:

Missouri Department of Natural Resources

Water Protection Program

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